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The Changing Role of POM (Production and Operations Management) Faculty

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The Changing Role of POM (Production and Operations Management) Faculty

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at the 1992 Production and Operations Management Society Meeting
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The Changing Role of POM (Production and Operations Management) Faculty

1.0 History of POM Faculty Roles

Prolonged periods of scarce resources cause reflection on the purpose and criticality of the various parts of an organization. At the University of Illinois at Urbana-Champaign, we are reevaluating our organizational composition in light of university-wide budget reductions and our desire (like some others) to be ranked among the best business schools in the U.S.. One of the outcomes of this reevaluation is the belief that POM is an important element in business education and research. About five years ago, we decided to reemphasize the teaching and research of POM in our business school (which we call "The College of Commerce and Business Administration"), and we plan to go forward in further developing this area. Our vision of the future, however, requires that we rethink the ways we teach POM, interact with industry, and join forces with our engineering colleagues. The main theme of this paper concerns the future for POM faculty in business schools and their roles in fostering world class business education into the 21st century. First, however, we will take a brief look at the history of POM in academia in order to provide an argument for needed change.

1.1 In The U.S.

Prior to World War II, POM was taught and researched from a (mostly) descriptive perspective. Indeed, any good textbook on "Management" combined Production, Labor Relations, Cost Accounting, and Manufacturing/Industrial Engineering concepts. Industry interacted with academics in research - with most research classified as field studies. Other research was more

prescriptive. For example, Frederick Taylor proposed time studies and methods analysis to determine the best way to get a job done. Even his research was done jointly with industry.

World War II ended, and a host of well-trained operations research analysts became available. At about the same time, the Carnegie and Ford Foundations widely publicized critical reports on the lack of science in business schools. The use of Operations Research (OR) methodology in solving manufacturing problems infused the science which was lacking in this business research. Indeed, OR methods widely contributed to manufacturing (hence, the reason it was called operations research), as well as to finance and marketing. More contributions are still forthcoming. Many business school POM faculty with this training and research capability will continue to solve the varied and complex problems in manufacturing and service operations. Indeed, the current set of POM faculty skills in U.S. business schools varies widely on a continuum of OR to field/case study methodology. The question we would like to address is "how will the mix of these skills need to be changed in the future to meet the challenges of tomorrow's academic and business environment?". We should note at this time that we believe research skills are needed across this continuum, and not all POM researchers or POM faculty groups can reasonably acquire the full range of these skills. Rather, we see a need for changing the overall mix of skills within the POM community in order to adapt to current and future management education and research demands.

Faculty in other parts of the university study and teach topics related to POM, albeit from different perspectives. Industrial Engineering departments sometimes overlap with the work done

in business schools. Here, we tend to see a good amount of applied OR work. Mechanical Engineering deals with new process technologies, focusing more on the development of the technology itself rather than its management. Business school linkages with engineering departments can provide for leading edge research which otherwise would be unobtainable in isolation. However, duplication of the (faculty) resources typically found in engineering departments may be a luxury that business schools will not be able to afford in the future competitive academic environment.

1.2 At the University of Illinois at Urbana-Champaign (UIUC)

In a redesign of our MBA program four years ago, we instituted a required core course in POM and started recruitment of POM faculty. With 3 new POM faculty, we offer 2 - 3 MBA electives beyond the required core course. We are again redesigning our MBA program. We plan to reduce the number of core courses by 3 (or so) so that students can specialize in 2 - 3 areas, if they choose. POM will remain one of the core courses, but more important, we will be able to offer a richer set of electives in POM, thus providing comprehensive specializations in manufacturing and service operations. Plant tours and outside speakers, organized by the POM club of MBA students, supplements their education.

In addition to the MBA courses, we also offer two (of four) POM doctoral seminars each year. Even though we plan consolidation and downsizing of our Ph.D. programs, POM is one of the areas that will continue to receive support for this endeavor. We have recently decided to require a course in POM for all business undergraduates. (For a number of years we required a

separate course in Operations Research (Quantitative Methods) at both the BS and MBA levels. Our staff in the Quantitative Methods area currently consists of 6 faculty.) However, to accommodate the projected teaching load in POM, we will need to hire at least 3 new POM faculty members, with a minimum of 2 required to staff the new POM undergraduate course. Unfortunately, budget constraints have kept us from doing so the past two years. We hope to find funding soon so we can fortify our POM faculty.

We believe that POM will become an increasingly larger proportion of the business school faculty for several reasons, one of which is the fact that a business school's customer base is demanding a more managerial-oriented product. Faculty in the POM area fit this product description better than those in methodological areas and, therefore, we may see the number of POM faculty increase over time while the number of quantitative methods faculty decreases.

2.0 Industry Competitive Needs

Why do we want to strengthen our POM program? It would be foolish not to do so. Clearly, manufacturing and service effectiveness (productivity) is a major element of improving the economy of any country. World class manufacturers from Japan and West Germany (and other countries) dominate market share in key industries in the U.S. by using manufacturing as a competitive weapon. As the world makes the transition to a truly global economy, manufacturing strategy and tactics will need to change. Managers will ask these questions more often:

- Should I build an "offshore" facility (or produce in Mexico) to take advantage of lower

labor rates? Will the increase in lead times caused by a more complex distribution system reduce my competitiveness ? Which firms/industries would gain by moving manufacturing to low labor rate countries?

- When should I convert my labor-intensive process to an automated one? If I automate, should I pay more for flexible automation? What is the effect on my marketing strategy? Will the elimination of labor hours through automation outweigh the reduced labor rates of "offshore" production?

- How much does it cost to introduce a new product in my manufacturing facilities and how can I drive that cost down? What is the nature of marginal manufacturing costs as related to product-mix?

- How can I improve the quality of my products and the system which makes them? What is operation's role in the new focus of quality?

- What are the effects of a Just-In-Time (JIT) production philosophy on my marketing strategy? Can cellular manufacturing be used to achieve some of the benefits typically associated with JIT approaches? Can I use cellular manufacturing techniques to reduce the need to automate?

Of course these are only a few of the issues facing industry. Few firms need convincing of the fact

that more efforts are needed in the POM area. Decision-making in today's complex and rapidly changing business environment, however, requires a broader set of skills and intellectual training to deal with these important operations issues.

2.1 The Market Niche of POM Faculty in Business Schools

Should POM faculty in business schools address these issues differently than those in engineering departments or in Operations Research groups? As in all academic fields, there is and will be some overlap in research and teaching between POM and other groups. Our focus, as a business school, should be to investigate and help to solve management problems. The faculty consists of experts in various disciplines, such as strategy, operations, marketing, finance, accounting, business law and organizational behavior. This brings a potential for cross-functional management research that would be difficult to achieve in an engineering department. POM faculty (and other business school functions) should use this collection of talents when developing courses and formulating research hypotheses. Deans should encourage joint work with other business disciplines since it can result in path-breaking results. Management research is clearly headed in this direction. At the University of Illinois, we intend to foster research through a set of cross-disciplinary research centers - a subject we will return to later. In any case, POM faculty need to always ask the question, "To what degree does this research or course advance the frontiers of management thought?" If it does not, then their work may appear more appropriate in engineering, and this appearance can hinder the acceptance of their work by business school peers and by managers.

Operations research methodology is still the dominant research tool of POM faculty, but it should become less so in the near future. As with any business function, many methodologies can be used to address POM problems. Meredith, et al. in a 1989 JOM paper [4] comprehensively outlines the types of research methodologies that are congruent with POM research. As evidence of maturity of the POM research area, a recent issue of JOM [1] was dedicated to empirical research studies. Therefore, it seems obvious that OR will not stay synonymous with OM or POM. OR's applicability is much wider than just POM. POM, like accounting, finance, and marketing, will see a variety of research approaches used in the future. Operations Management, which reflects managerial, process issues as well as analytical, content issues, will become increasingly important as business schools, including Illinois, work to mold the study of operations into an integrated approach to business management.

3.0 Changing Roles of Business Schools

The business school of the 90's and of the 21st century will look much different than that we became comfortable with in the 70's and 80's. Demographic changes, the evolution of technology for delivering education, and the move to a global economy will motivate major changes in our approach to education and research.

Undergraduate applications to business programs are (generally) down. This trend reflects a decline with the number of 18 year olds and the percentage of those who chose to study business. We at the University of Illinois are somewhat fortunate in this regard since, as the major state university, we will continue to get the cream of the undergraduate students in our state.

We are continuing to strengthen our undergraduate program based on this fact, with the overall goal of bringing our undergraduate program's quality to one of the top three programs of its kind in the country. As part of this endeavor, we expect to offer an undergraduate track in the POM area, perhaps with participation from the engineering school and human resources area.

There is fierce competition for the best MBA students, and it is clear that "standard" MBA programs will probably not grow considerably during the next 10 years. However, at the University of Illinois we will be emphasizing master's education that allows students to specialize in various cross-functional areas. Technology management, for instance, has a strong POM element, yet it also draws strongly from other functional fields. POM faculty will play a critical role in such a new program.

Technology will also change the role of POM faculty. On one hand, we will see the use of computer and video technology enhance and, in some cases, replace the human instructor. We are not suggesting that we eliminate faculty by replacing him or her with a VCR, but the basic approach to course design must be reevaluated as this new technology, including the new multi-media techniques, becomes easier to use and more effective. Perhaps, multi-media techniques can be used as the basis for video-based cases ~ providing students with not only a text of a case, but also with a video tour of the plant and interviews with the managers who were involved in the case study. On the other hand, we need increased faculty involvement in project-based courses that provide our students with more "hands-on" experience in firms on real problems. Another way to provide "hands-on" experience is through simulation-based courses that require students to

make management decisions and compete against other "companies" in a controlled environment. Simulation- and project-based courses can consume a good deal of faculty time, but may be more easily offered as we find ways of using technology to remove us (at least partially) from the traditional lecture environment.

The move toward a global economy will require business school faculty to become more aware and educated in international business issues. To do so may require investment in overseas travel for the faculty - something that can become quite expensive. Without an international orientation and exposure, however, it is not clear that faculty can reasonably address international issues in their classroom.

3.1 Executive Development Programs

The demand for continuing education for managers is growing.[1] We need to develop this market and are currently reviewing our efforts in this regard. We view the Executive MBA program as an important element in our educational offerings. Ours was recently ranked 12th best in the nation by Business Week [2]. Beyond the EMBA program, we see the need for continuing education for managers. In order for managers to remain competitive and useful in a dynamic business climate, business schools will need to form a "continuous learning" environment that augments the traditional BS and MBA programs. POM faculty can play an important role in such management development programs. A host of seminars could be offered in this area. We,

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[1] The Economist (March 1991) [3] estimates that the shorter, executive courses for older managers brings in over $3 billion a year which is more than what traditional MBA programs generate.

for example, are launching 4 new 2-day executive development seminars in POM - one on Operations Strategy, one on Total Quality Management, one on Operations Planning and Control, and one on Investing in New Manufacturing Technology. Others are possible. These programs may bring additional revenue but, more important, they are great ways to build links with industry. Through interaction with practitioners, our faculty also gain a breadth of experience that can be brought back to the "traditional" classroom and can be used to help develop broader research programs.

3.2 Industry Interaction in Research

One of the major problems associated with empirical research in POM is a lack of real data. Industry interest and interaction may provide data that will help answer research questions that were not possible to address in the past. Further, this interaction promises to provide additional funding for research projects that has otherwise been unavailable to business school faculty. Perhaps most significant is the potential that interaction with industry offers in regards to better identifying important research issues and the variety of constraints that managers face when dealing with complex problems. Identifying meaningful management research issues can be difficult when cloistered in one's office.

3.21 Need for Data

Government collected data (for example, from SEC filings or from the Census Bureau) has limited usefulness in POM research. One reason for this is the (seemingly) lack of correlation between reported financial data and operations

effectiveness. (Perhaps this can be a study in its own.) We all know that most firms work with more than one set of accounting numbers. The government does not require that the cost information at the more detailed level be reported to the public, so it often becomes proprietary data. Getting a look at such data and publishing research results associated with it can be difficult. If a firm or set of firms is actively participating in a research project, fears of lost confidentiality can be reduced, and, thus, more data may become available. Unfortunately, standard accounting practices do not necessarily exist for manufacturing data, so working with data from a cross-sectional perspective may be perplexing.

Another way to collect data from manufacturing firms is through survey mechanisms. Indeed, it appears that much of the empirical work in POM has used this approach. While any one researcher can collect data specific to a narrowly defined research question, it would be much better if data collection (through this method) could be centralized via a research center or consortium.

3.22 Broader Research Methodologies

As was earlier mentioned, Meredith et al. thoroughly discuss the types of research methods that are available to POM researchers. Interaction with industry will, in many cases, foster the use of a variety of research methods. As the problem definition becomes fuzzier (as can be expected when looking at real-world problems), the research methodology must be of a more robust nature - albeit at

the expense of elegant, closed form solutions. POM faculty and business school deans must become comfortable with such changes in research approaches in order for industry interaction to occur on a more regular basis.

3.3 Joint Programs with Engineering Schools

Overlaps with engineering schools should be pursued for a variety of reasons. The POM function is probably the most comfortable with research and education in engineering schools, since many current POM faculty in business schools had early training in engineering and because manufacturing departments in firms are typically run by engineers. Familiarity with POM often means familiarity with engineering, especially the industrial and mechanical engineering areas.

We at UIUC are currently developing joint curriculum with our engineering school in the area of technology management. The overlap here is not hard to see. We have one of the world's best engineering schools and our interaction with it will provide numerous benefits to students and faculty in both business and engineering. The POM faculty will play a vital role in this joint educational program as they are our major link to engineering and have a sense of how to translate the engineering orientation into a business context, and vice versa.

In the area of research, the development of joint or, in some way connected, research centers again appears to be beneficial to both parties.

4.0 Impact On POM Faculty Skills

Most POM faculty were trained in operations research/management science disciplines. While this seems most appropriate considering the types of problems traditionally addressed by such faculty, the future should bring a wider collection of research skills to the table. Further, understanding of global issues in both manufacturing and service operations is becoming a requirement for educating business school students. Additionally, the ability to teach in executive development programs will become crucial as business schools evolve during the next 10 to 20 years, as evidenced by the growing interest of firms in continuing education for their employees.

4.1 Development of Current POM Faculty

How do current POM faculty keep pace with these changes? First, the need to understand international dimensions and to interact with practitioners is not unique to POM faculty - we need to develop all business school faculty in this regard. Sometimes the development takes place through an international education program, for example, like the one we have developed with the University of Warsaw, Poland. For two years, four of our faculty (each from a different area - POM is one of these) will teach a course in their brand new MBA program. Not only will we be providing input into their curriculum, we will be receiving an up-close experience of a transitioning Eastern Bloc economy. Since it is likely that the U.S. and other Western nations will be doing increasing business with Eastern European and former Soviet Union countries as we approach the 21st century, such an experience for a core set of our faculty can be invaluable. An understanding of the problems that managers in these countries face can better prepare our students (when they become managers) to interact with firms in these countries.

Internationalization of our teaching and research is of central importance and the Warsaw effort is only one example. We continue to build relationships with selected high quality academic institutions around the world. We already have more than 15 such relationships, in the form of exchange programs, but plan to increase the quality and depth of our ties rather than increase the number. We expect that this network of 12-15 foreign business schools will become an integral and coordinated part of our activities. POM faculty involvement in this network will also foster understanding of international issues. Another way to provide international experience is to fund faculty travel overseas to attend conferences or to visit firms. Many of these activities will be organized on a boundary spanning basis, such as under the umbrella of "technology management" research and education.

Teaching at the executive level is not easy, as many of us have found out. Managers tend to be demanding students and come to us with knowledge that we may not already possess. To the extent that faculty can interact with practitioners on a more frequent basis, the vocabulary becomes consistent and both parties will become more comfortable with each other. Joint research with industry can be an excellent source of interaction, and future recruitment of business school faculty may need to weigh the amount of industry experience/interaction that a faculty candidate possesses.

Developing research skills, in addition to the OR skills already at hand, may prove to be the most difficult dimension of POM faculty development. Not all POM faculty need to work outside the OR discipline to continue to provide significant contributions to the field. However, it

seems that for the POM area to mature and maintain credibility from the rest of their business school colleagues, a wider set of research skills within a POM faculty group will become necessary. Some faculty will retrain themselves - perhaps in field research methods or data collection instruments. Others may do so with specific motivation from their dean. How this motivation should be provided is a difficult question to answer. In some ways, the market itself will provide sufficient motivation. When major journals in the operations area solicit research papers from a "non-traditional" approach (as they have - for example see [1]), some POM researchers will take the steps on their own to re-tool in a research methods area that seems promising to him or her. On the other hand, the institution must have the flexibility to reward non-traditional research. Choice of outside reviewers for tenure and value judgements of journals must be made carefully for the junior faculty member who is taking on such risks.

4.2 Updating Ph.D. curriculums

An easier way to insure that POM faculty meet the competitive needs of the future is to encourage the evolution of Ph.D. curriculums. A requirement or strong motivation for doctoral students to interact with industry on a research project during their studies is one way to accomplish this. Another is to allow a minor course of study to be taken in a non-traditional research discipline (for example, in OB or Psychology). Our business school strategy at Illinois identifies POM as one of the 6 areas of doctoral study in our business school for the foreseeable future. Even as we streamline our wide array of doctoral programs, we believe that operations management is a critical area of study that fits our mission well.

5.0 Implementing the Change

Implementing the variety of changes that we have outlined may be difficult. Paradigms tend to be difficult to change. At the University of Illinois, our strategic plan suggests various avenues to accomplish this change. First, we plan to develop research centers that cut across department disciplines to both highlight and strengthen our focus on research. A newly created position of Associate Dean of Research will oversee these research centers and assist in promoting their use to meet the objectives of the business school. We expect that the research produced in the centers will be incorporated into existing courses and will be the basis for new courses. We also foresee that this research will foster expanded interaction with the business community. Research centers can organize the collection of company data, interact with practitioners through symposia, and allocate resources for research.

What we want to provide are creative linkages among the research, teaching, and service components of the faculty's job. By simultaneously creating these linkages and providing reward systems that encourage faculty to cross functional boundaries to accomplish meaningful research and teaching, we hope that paradigms can be changed for the better. Indeed, POM faculty have already provided a good deal of boundary-spanning research and have incorporated these new ideas into their teaching. Explicit mechanisms to reinforce and promote new work of this type should prove beneficial, if carefully implemented.

POM faculty need to change as the competitive nature of business changes and the role of business schools evolve. Those who do so will become valuable members of the business school

organization. Indeed, the way any POM faculty member or POM group in a business school chooses to focus their research skills should consider how they can best contribute to POM education and to helping solve the variety of current and future POM problems. No one can become an expert in all methodological areas. Business schools may want to determine their relative strengths and build a POM group with this in mind. Most important is the ability to look ahead and determine the way the in which the mix of skills in POM should change in the near future and beyond.

POM, as an area, can flourish and become an even more critical component of business schools if it aggressively meets the challenges and opportunities currently presented to it. We believe that POM faculty have the chance to play a decisive role in turning around the current economic environment of this country and the world through the education of future managers and through meaningful research to improve quality and productivity.

References

1. Berry, W.L., T.J. Hill, J.E. Klompmaker and C.P. McLaughlin, "Linking Strategy Formulation in Marketing and Operations: Empirical Research," Journal of Operations Management, Vol. 10, No. 3, 1991, pp. 294-303.

2. Byrne, J.A., "Back To School: The B-Schools That Are Best In Executive Education," Business Week, October 28, 1991, pp. 102-107.

3. The Economist, "Management Education: Passport To Prosperity," March 2, 1991, pp. 3-26.

4. Meredith, J., A Raturi, K. Amoako-Gyampah, and B. Kaplan, "Alternative Research Paradigms in Operations," Journal of Operations Management, Vol. 8, No. 4, 1989, pp. 297-326.

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